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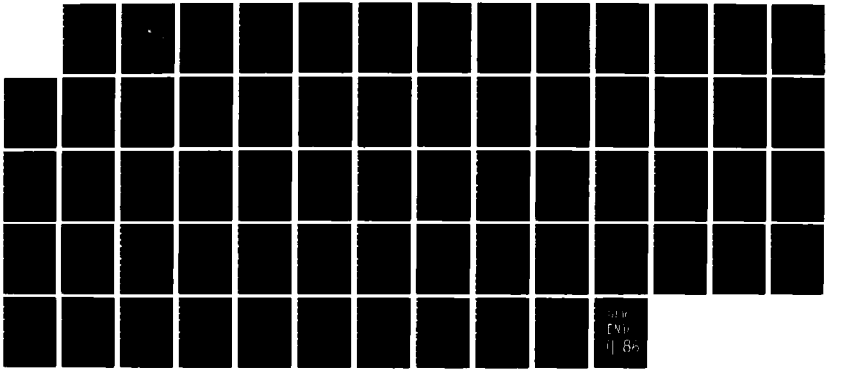

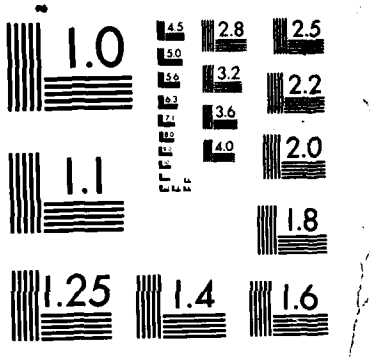

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

GENERIC OBSTACLES AND DIFFICULTIES ASSOCIATED WITH THE MEASUREMENT AND ENHANCEMENT OF PRODUCTIVITY IN SHORE INTERMEDIATE MAINTENANCE ACTIVITY (SIMA), NORFOLK, VIRGINIA

by

Christopher M. Moe

December 1985

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This study examines the current effectiveness of measures utilized by Shore Intermediate Maintenance Activity (SIMA), Norfolk, to enhance productivity through capital investment. Included is a brief history of the Productivity Enhancing Capital Investment (PECI) Program and the effects of past legislation by the Department of Defense (DoD), leading to the current program within the Department of the Navy (DON). The analysis includes opinions and impressions of various levels of management within the organizational structure of SIMA. This study culminates with a discussion of the current impediments affecting the effectiveness of the PECI program.

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Generic Obstacles and Difficulties Associated with the Measurement and Enhancement of Productivity in Shore Intermediate Maintenance Activity (SIMA), Norfolk, Virginia

by

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Lieutenant Commander, United States Navy
B.S., United States Naval Academy, 1974

Submitted in partial fulfillment of the requirements for the degree of

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ABSTRACT

This study examines the current effectiveness of measures utilized by Shore Intermediate Maintenance Activity (SIMA), Norfolk to enhance productivity through capital investment. Included is a brief history of the Productivity Enhancing Capital Investment (PECI) Program and the effects of past legislation by the Department of Defense (DoD), leading to the current program within the Department of the Navy (DON). The analysis includes opinions and impressions of various levels of management within the organizational structure of SIMA. This study culminates with a discussion of the current impediments affecting the effectiveness of the PECI program.

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ABBREVIATIONS AND ACRONYMS

ANS(MRA&L)	Assistant Secretary of the Navy, Manpower Reserve Affairs and Logistics
CNO	Chief of Naval Operations
CNSL	Commander, Naval Surface Forces Atlantic
CO	Commanding Officer
DoD	Department of Defense
DON	Department of the Navy
DPP	Defense Productivity Program
DPPO	Defense Productivity Program Office
EOB	Expense Operating Budget
ETV	Engineered Time Values
IMA	Intermediate Maintenance Activity
IPE	Industrial Plant Equipment
MCS	Management Control System
MIS	Management Information System
MTM	Method-Time-Measurement
NAVCOMPT	Comptroller of the Navy
NAVSEASYSCOM	Naval Sea Systems Command
NOB	Naval Operating Base
OFSE	Operating Forces Support Equipment
O&M,N	Operations and Maintenance, Navy
OP,N	Other Procurement, Navy
OSD	Office of the Secretary of Defense
OSU	Own Ship's Use

PE	Productivity Enhancement
PECI	Productivity Enhancing Capital Investment
PEIF	Productivity Enhancing Incentive Fund
PIF	Productivity Investment Fund
POA&M	Plan of Action and Milestones
PPBS	Planning, Programming, Budgeting System
QA	Quality Assurance
RSG	Readiness Support Group
ROVD	Repair Other Vessels Direct
ROVI	Repair Other Vessels Indirect
SECNAV	Secretary of the Navy
SIMA	Shore Intermediate Maintenance Activity
SRA	Selected Restricted Availability
TYCOM	Type Commander
XO	Executive Officer

I. INTRODUCTION

A. BACKGROUND

The present Department of Defense (DoD) productivity program represents over 75 years of improvement efforts. Yet even with all the emphasis on work measurement and labor saving devices, the Department of the Navy (DON) continues to face problems in the management of its productivity program. As was done in the past, the question has to be asked as to whether or not the Navy program lacks management emphasis and resources. Is productivity enhancement working in Naval activities? Specifically, is productivity enhancement working at the Shore Intermediate Maintenance Activity (SIMA), Norfolk?

The last time these issues were raised, the Navy's program was viewed as unsuccessful. The lack of success was directly related to inadequate use of management resources and insufficient emphasis on the potential benefits the program offered. The result was a comprehensive Plan of Action and Milestones (POA&M). Now four years later, the same problems plague the DON and SIMA. Congressional interest stemming from increased pressure to reduce the budget deficit and internal concern that the Productivity Enhancement Capital Investment (PECI) program is not improving DON efficiency, has resulted in greater uncertainty as to the future of the PECI program.

This thesis may provide some further insight into the problem and the potential solution at SIMA, Norfolk.

B. INTEREST AND PURPOSE

As a student of financial management and a professional Naval officer, the author was concerned that little was known about the problem of productivity and its relationship with the Navy. In fact, the normal Naval officer knows very little about capital investment and its impact on productivity. In undertaking this study, it was the intent of the author to provide, as simply as possible, the purpose of the PECI program, the SIMA's existing productivity enhancement program, shortfalls in the program at SIMA, and the options currently facing SIMA.

But all the historical development and early growing pains within the DoD can almost be considered irrelevant. For what is needed is an assessment of SIMA's productivity program, and what can be done to improve it. Therefore, in addition to conducting literary research, the opinions, impressions, and thoughts of SIMA's various management levels were included. Their frankness and genuine concern regarding their own interests and the interests of SIMA's overall organization were very much appreciated. Without their input, this work would be meaningless.

C. THE NATURE OF THE PROBLEM

In analyzing the SIMA in Norfolk several important facts stand out. First of all, if SIMA is growing, is productive,

and still is not utilizing the PECI program as designed, then one would have to seriously question the need for a productivity program at all. The number of ships SIMA services has increased. The overall quality of workmanship is better due to increased emphasis on quality assurance. The total number of jobs in progress has expanded. Yet there is little knowledge or use of the PECI program at SIMA.

The issue is not solely one of output. The ability to produce greater output with a limited amount of input must also be considered. With resources diminishing, the number of surface ships increasing, and limitations on the defense budget growing annually, productivity enhancement requires increased emphasis. The ability of the SIMA to continue to meet their current level of output should be seriously questioned. The question then becomes what is needed and how best to achieve it.

D. ASSUMPTIONS

In the writing of this thesis, the author has made the following assumptions:

1. productivity enhancement is a viable solution to the issue of scarce resources if increased production is going to be realized;
2. that, although it would be impossible to interview everyone involved in the organization of SIMA, selected interviews from a wide variety of participants in ship repair and maintenance would provide valuable insight that is worthy of consideration;
3. productivity enhancement is vital if the SIMA is to meet the growing maintenance and repair needs of an expanding surface Navy.

E. ORGANIZATION

This thesis is divided into an introduction, four research chapters, and a final chapter of conclusions. Chapter II provides a historical review of the DoD's productivity enhancement program. Chapter III addresses the Management Control System (MCS) of the SIMA as it relates to productivity levels in ship repair and maintenance. Chapter IV provides an overview of the productivity measurement tool used by SIMA to evaluate its effectiveness in ship repair. Chapter V outlines the opinions of representatives from various levels of SIMA's management and observations made by the author during on-site thesis work, both of which indicate obstacles to the success of productivity at SIMA. Finally, Chapter VI describes the conclusions of the author based on the research presented in the preceding chapters. It should be noted that the conclusions and recommendations are those of the author and not of the SIMA representatives interviewed.

II. BACKGROUND OF DOD PRODUCTIVITY

Historically, man has had to deal with technological advancements. With each development the input of human labor has generally diminished. Handicraft production gave way to mass-production, and eventually automation replaced both of these earlier technologies. Management of scarce resources grew in intensity as nations attempted to maximize output while minimizing input. Today, resource management and output levels are still of vital concern to both private and public sector industry. In order to understand the current interest in productivity, particularly in the Department of Defense (DoD), one must be aware of how the need for both efficiency and effectiveness in government evolved. This chapter is a summary of the history of the Department of Defense Productivity Program and its organizational relationship to the Department of the Navy (DON).

A. EARLY DEVELOPMENT OF THE DEFENSE PRODUCTIVITY PROGRAM

Since the turn of this century there has been an ongoing internal effort within the federal government to improve productivity. The first fifty years of this period placed broad emphasis on many types of measurement programs. The concept of work measurement, although initially unpopular in government, drew support from the successes of similar management practices in private industry. From 1950 to 1965 cost reduction

and resource management were part of a wide range of programs within DoD aimed at answering the specific problem of command efficiency and effectiveness.

Finally, legislative interest and a joint study by the General Accounting Office, the Civil Service Commission, and the Office of Management and Budget saw the establishment in 1973 of a permanent federal sector program for productivity measurement [Ref. 1:pp. 34-35].

B. DOD PRODUCTIVITY PROGRAM ESTABLISHMENT: 1970-1975

By 1973 productivity enhancement (PE) was a new emphasis within the Department of Defense. The Army Materiel Command piloted the first operational evaluation in FY 1973 and the potential applications were felt in all the services by 1974. In 1975 DoD acted on the positive feedback it had acquired from the test programs and permanently established the productivity program. Four major elements were identified in the DoD program:

- Productivity measurement and evaluation.
- Work methods and measurement improvement.
- Productivity enhancing capital investment.
- Workforce motivation. [Ref. 2:p. 316]

C. OPERATIONAL OVERVIEW: 1975-1985

From the start, defense productivity aimed at optimum growth (increase the amount of goods and services produced relative to the amount of resources used) throughout the

Department of Defense [Ref. 3:p. 1]. The objectives of the program were aimed at three areas:

- Promote productivity improvements at all levels of responsibility.
- Foster the use of productivity measurements.
- Establishment of a working environment that considers worker/manager relationships. [Ref. 4:pp. 231-232]

Reorganization, consolidation, and further refinement eventually led to issuance of the first productivity directive, DoDD 5010.31, in 1979. Centralization was he main outcome of this initial directive. For the first time, in over thirty-five years, government productivity was organized to achieve efficiency.

To complement centralized management of productivity, DoD formed the Defense Productivity Program Office (DPPO) in 1979. Its primary aim was to integrate all government agencies and the services under a uniform program. [Ref. 5:p. II-9] By 1980 the first of many initiatives designed to provide savings in resources, dollars, and manpower were under review in DoD and the services.

D. DEPARTMENT OF THE NAVY'S ADMINISTRATIVE PROGRAM

Responding to DoD directives, the Secretary of the Navy, along with the other service secretaries, established policies to support the concept of productivity within DoD. Initially, the objectives sought to improve readiness at all command levels. Emphasis was placed on management and organizational

performance. Specifically, the program addressed the following objectives:

- Elevate visibility of productivity as an essential dimension of management within the DON.
- Develop productivity enhancement initiatives as a means to achieve the highest possible level of readiness within available resources.
- Stimulate managers, at all levels of organization, to focus on the underlying mission of their organizations, to develop valid measures of output, and explore methodologies to improve organization performance.
- Create a climate which will lead to the implementation of a well organized and economically sound productivity enhancing capital investment program.
- Enhance the Quality of Working Life of the Navy's military and civilian workforce through the establishment of meaningful incentives and the elimination of disincentives to productivity.
- Foster the utilization of productivity data in program, budget and performance evaluation. [Ref. 6: pp. 1-2]

Parallel implementation of similar objectives occurred within all the services. Organizationally, each service established a central point for administration of the program. The Assistant Secretary of the Navy, Manpower, Reserve Affairs and Logistics (ASN(MRA&L)) fulfilled this requirement for the DON. [Ref. 7:pp. 2-5]

Prior to the implementation of the Defense Productivity Program (DPP) the main impediment to project funding was the defense budget process. Therefore, coincident with the issuance of the first DoD directives, the Department of the Navy established a fund to support Productivity Enhancement (PE) projects.

E. DEPARTMENT OF THE NAVY'S FUNDING PROGRAM

After 1980 the process of identifying projects for capital investment began working. Identification of funds to support these investment initiatives was in development. By 1982, the Comptroller of the Navy issued NAVCOMPT INSTRUCTION 7000.38A. In addition to addressing the funding source for investments, policy on amortization of projects and follow-up reporting criteria were emphasized. These project data were not only intended to support the initial justification for acquisition, the same data were also vital to the establishment of a capital investment data base and an eventual productivity management information system (MIS). The most important points of the Productivity Enhancing Incentive Fund (PEIF) were:

- Funding was provided in the current year.
- The two year budget cycle was avoided.
- Capital investment, substituted for labor, optimized the potential output of the work force.
- The investment could not exceed $100,000.
- Projects must amortize within two years of the date they became operational. [Ref. 8:pp. 1-2]

By FY 81, a second fund, with no upper dollar limit, was initiated by OSD to meet a perceived problem in the historical use of the PEIF fund within the services. Thus, within the first ten years of revitalization, the Navy had provided a solid foundation of instructions and directives, and the financial tools necessary to enhance productivity within its subordinate commands.

F. THE MAJOR CLAIMANT: COMMANDER, NAVAL SURFACE FORCES ATLANTIC (CNSL)

Productivity Enhancing Capital Investment (PECI) at the claimant level is supported through the Other Procurement, Navy (OPN) budgeting process. Three capital investment areas are considered:

- Operating Forces Support Equipment (OFSE);
- Industrial Plant Equipment (IPE);
- Productivity Enhancing Capital Investment (PECI). [Ref. 9]

Administratively, the claimant reinforces productivity guidance and program objectives by reissuing higher level instructions from DON, the Secretary of the Navy (SECNAV), Chief of Naval Operations (CNO) and the Comptroller of the Navy (NAVCOMPT). The claimant diverges from broad policy and provides the administrative guidance necessary for proper submission of OPN fund requests. The primary vehicle used to solicit inputs is the budget call. Thus, the major claimant provides an intermediate point for DON to manage capital investment administratively and financially. In addition, the claimant oversees PECI performance of the first line productivity managers.

G. FIRST LINE MANAGERS: SHORE INTERMEDIATE MAINTENANCE ACTIVITY (SIMA)

First line managers are the grass roots of the productivity process. The activity level within the Navy represents a major source of capital investment. These are the commands

that are concerned with keeping the operational fleet at peak readiness. The measure of productivity at this level is usually based on very judgmental criteria.

At SIMA Norfolk first line managers evaluate shop productivity on professional "gut feeling." Characteristics that support this judgmental estimation focus generally on personal motivation of shop personnel, skill acquired through on-the-job experience, and training received through technical schools. Most of these same managers based considerable weight on their individual ability to gauge productivity through visual evaluation of shop activity. This visual perception was further supported by each manager's knowledge of jobs in progress and projected completion dates required to meet the ship's departure from the repair availability.

SIMA also has a software management system which is designed to track productivity and provide various trend analysis forecasts, but this management tool generally lacked credibility in the eyes of the first line manager. Additional discussion of this software system is provided in Chapter IV.

Defining productivity at the first line manager position is difficult. This individual is concerned with the minute-to-minute management decisions he is paid to make. Evaluation of his division's productivity is "gut feeling" because his ability to devote time to analysis and better management control is limited. The next chapter addresses the Management Control System (MCS) at SIMA, Norfolk.[1]

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[1]SIMA, Norfolk, Virginia interviews with the Repair Division Officers, August 1985.

III. THE MANAGEMENT CONTROL SYSTEM

A Management Control System (MCS) is generally designed based on the organization characteristics and the interaction which occurs among its employees. Structurally the units in an MCS are characterized by several types of responsibility centers. All of these organization units are concerned with measurement of outputs and inputs. Each center also has a manager who uses this measurement to evaluate his unit's performance. Usually responsibility centers focus on a singular type of measurement. Common types of responsibility centers are:

- Expense Center. Inputs are measured in terms of monetary costs. Outputs are either not measured or they are measured in terms of money.
- Revenue Center. Revenue maximization is the primary concern. Revenues are measured in monetary terms.
- Profit Center. Revenues and expenses are measured to determine profit.
- Investment Center. Profit and the capital which contributes to profit are measured. [Ref. 10:p. 26]

The MCS process depicts what the organization does. In an organization, the daily interaction of workers and management can be informal or formal. Employee conversations, or meetings represent informality, whereas the formal process is characterized by four distinct but interrelated phases. These phases of the MCS occur regularly and are adjusted as factors within the organization change. [Ref. 11p. 26]

The phases of an MCS are:

- Programming. This phase shows which, when, and what amounts of resources will be used in specific organization programs. These programs generally relate to the output of goods or services.

- Budgeting. This phase is concerned with the operating budget, which is usually planned for one year.

- Reporting and Analysis. This phase represents the data base of information used by managers at all levels to predict trends and forecast future needs. Actual performance can be compared with planned performance.

- Operating and Measurement. This phase tracks the costs and the revenues which result from the various programs. [Ref. 12:pp. 26-28]

Management Control Systems (MCS) in today's organizations are classified as either "profit-oriented" or "nonprofit." The former measures success almost entirely in terms of profitability while the latter views success relative to the amount and quality of the service rendered. Management decisions are also biased towards areas that increase profits or improve service.

Shore Intermediate Maintenance Activity (SIMA), Norfolk is a "nonprofit" organization. Publicly-oriented, SIMA exists to render repair service to individual clients, Navy ships. The measurement of output is a technical problem characteristic of service organizations. [Ref. 13:pp. 1-10]

How much service is provided or how well it is rendered is more judgmental than quantifiable. The input/output relationship that assures both effective and efficient use of resources in a profit-oriented organization, is less measurable in the nonprofit arena. [Ref. 14:pp. 745-753]

Government and its associated agencies and departments are service organizations. DoD's service output is national defense. Internally, the service branches are integrated to support this end. Within the DON, SIMA Norfolk's input to national defense is intermediate maintenance for Navy ships. This chapter is a summary of the Management Control System (MCS) that exists at SIMA, Norfolk, Virginia.

A. SIMA: ORGANIZATION AND MISSION

The Shore Intermediate Maintenance Activity (SIMA) at Norfolk, Virginia is a repair facility. It services over 150 fleet units of the U.S. Navy based at the Norfolk Naval Base. All of SIMA's repair equipment, administrative offices, and logistics and support facilities are housed within a 205,000 square foot complex. From its main facilities located within the Destroyer and Submarine pier area, SIMA provides both ship-to-shop repair and onboard repair for Naval ships assigned to the Naval Operating Base (NOB).[2]

Functionally, SIMA, Norfolk is a "Shore" Intermediate Maintenance Activity (IMA). Navy tenders are classified as "Afloat" IMA's. Both types of IMA's work under the direction of Naval Surface Forces Readiness Support Group (RSG), Norfolk. The RSG acts as a screening agent for all work assigned to an IMA. Assignment of ships to an IMA is the responsibility of

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[2]SIMA, Norfolk, Virginia, telephone interview with the Repair Officer, September 1985.

Commander, Naval Surface Forces Atlantic (CNSL) (see Table 3.1).

The SIMA's organization is pyramidal in design. At the apex is the Commanding Officer (CO). The Executive Officer (XO) exists within the structure to provide continuity to the chain-of-command. The XO's primary role is administrator. Operationally, four departments: (1) Repair, (2) Supply, (3) Administration, and (4) Quality Assurance (QA) fulfill the needs of ships assigned for availability (see Table 3.2).

Approximately, 1000 military personnel are assigned to SIMA Norfolk. The majority of these individuals work in one of eight responsibility centers within the Repair Department. The remaining personnel work in administration, supply, or QA. All key managerial positions are staffed by Navy officers or chief petty officers in pay grades E-8, or E-9.[3]

The SIMA's $8,000,000 annual operating budget supports the command's primary mission of ship repair.[4] The CNSL assigns ships to three types of repair availabilities:

1. Intermediate Maintenance Availabilities (IMAV). Routine repair periods designed to maintain a ship's operational readiness between major overhauls.
2. Selected Restricted Availability (SRA). An availability scheduled by the Chief of Naval Operations (CNO) to accomplish Naval Sea Systems Command (NAVSEASYSCOM) alterations (K ALTS), and specific Type Commander alterations (D and F ALTS). The SRA's are specific

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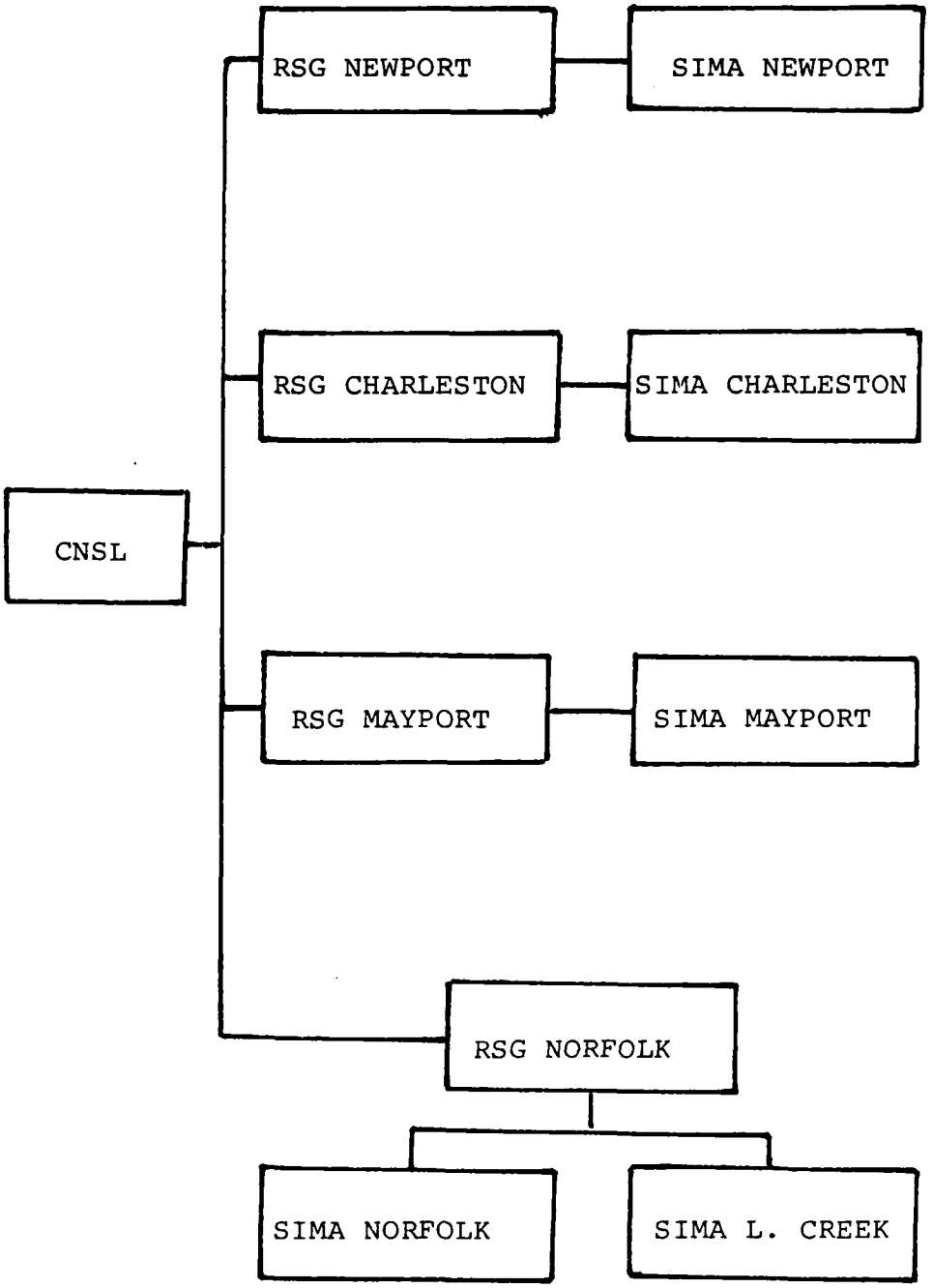
[3]SIMA, Norfolk, Virginia, telephone interview with the Repair Officer, September 1985.

[4]SIMA, Norfolk. Virginia, interview with the Supply Officer, August 1985.

TABLE 3.1

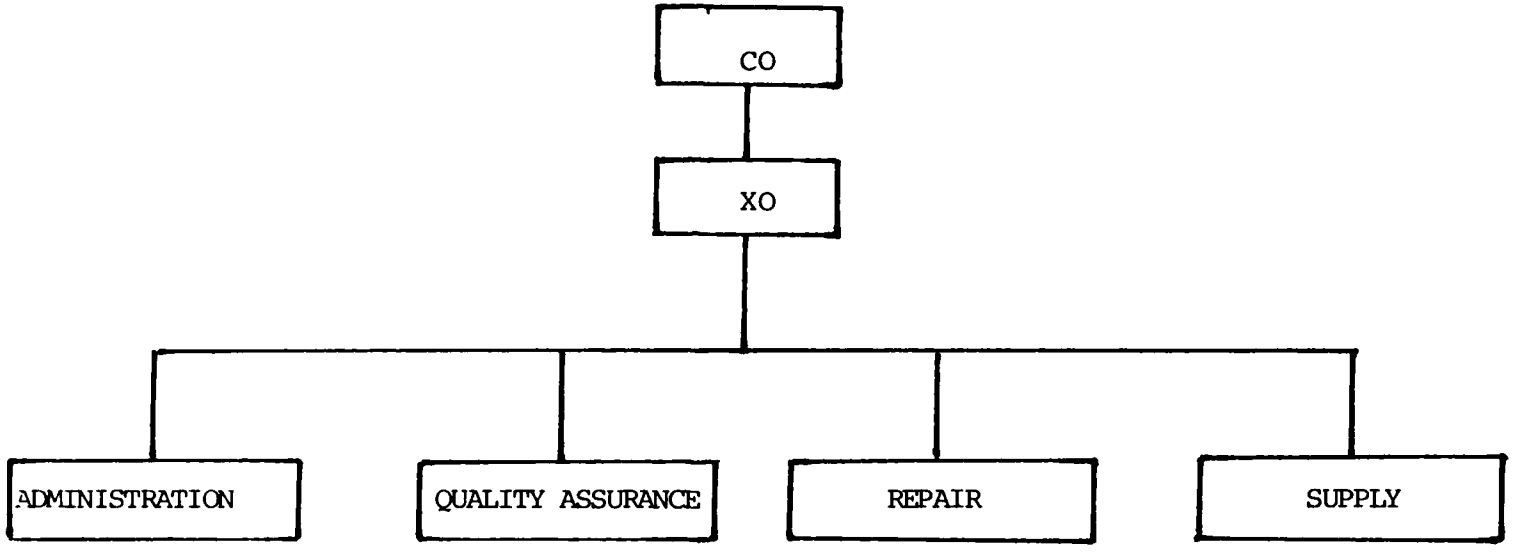
SIMA, NORFOLK'S EXTERNAL ORGANIZATION COMMAND RELATIONSHIP



[5]CNSL, Norfolk, Virginia, telephone interview with the Material Officer, September 1985.

TABLE 3.2

SIMA, NORFOLK'S INTERNAL ORGANIZATION COMMAND RELATIONSHIP



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[6]SIMA, Norfolk, Virginia, interview with the Administrative Officer August 1985.

for each class of ship. The maintenance is usually performed in a shipyard.

3. Concurrent IMAV. Ships in major overhaul have an IMA assigned to provide the same type of repair found in a routine IMAV. This service supplements the industrial work provided by the shipyard. [Ref. 15:pp. 4711-4712]

The CNSL uses the quarterly employment scheduling conference to assign ships to repair availabilities. Naval ships come into availability approximately once per quarter. The usual length of the repair period is three to four weeks, and during this period ships normally remain pierside.

The SIMA currently services approximately 70 ships per quarter. On a daily basis 18-21 ships will be in availability and an additional 8-9 ships will be in a concurrent availability or an SRA.[7]

Although ship repair is SIMA's principal mission, it also is a reserve headquarters for 26 reserve units that drill at SIMA, Norfolk on a routine basis.[8] The remaining discussion of SIMA's MCS will address the MCS processes that support the organizational structure and mission.

B. THE MANAGEMENT CONTROL PROCESS

> The management control process takes place in an organization that already exists, that has objectives, and that has decided on broad policies for achieving these objectives. [Ref. 16:p. 28]

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[7]SIMA, Norfolk, Virginia, interview with the Repair Officer, August 1985.

[8]Ibid.

> Much of the management control process involves informal communications and interactions among managers and workers. Informal communications occurs by means of memoranda, meetings, conversations, and even by such signals as facial expressions. [Ref. 17:p. 26]

> . . . most companies also have a formal management control system, which includes the following interrelated phases of programming, budgeting, operating and measurement, and reporting and analysis. [Ref. 18:p. 26]

The SIMA has both an informal and a formal management control process. On a day-to-day basis SIMA functions in an informal environment of meetings. Information flows internally within departments and between departments. The majority of the information flow at SIMA involves production status on ships in availability. Information exchanged between the ship and SIMA is both informal and formal. Weekly progress meetings, as well as arrival and departure conferences lend formality and structure to the routine informal information exchange that occurs at the actual job repair level.

1. Programming

> In the programming phase, decisions are made with respect to the major programs in which the organization is to engage during the coming period. . . . Some organizations state their programs in the form of a "long-range plan" which shows planned outputs and inputs for a number of years ahead--usually five years. [Ref. 19:p. 30]

The programming phase at SIMA addresses both current year operations and outyear forecasting. Financially, CNSL annually sends down its budget call to SIMA for both current year Operations and Maintenance, Navy (O&M,N) and Other Procurement Navy (OPN) funding inputs. Outyear OPN funding

requests include the current fiscal year and the two subsequent fiscal years. Significant emphasis is placed on screening all OPN requests for possible productivity enhancement applicability.

The quarterly scheduling process conducted at CNSL takes ship, squadron, and type desk inputs and integrates the individual concerns of each responsibility level into a comprehensive fleet matrix which reflects not only operational and training requirements, but also repair availabilities. CNSL's input at the scheduling conferences addresses SIMA's short and long term programs.

The SIMA, via CNSL, is able to project which, when, and what amounts of resources will be used on each ship that comes into availability. The joint efforts of all four of SIMA's major departments work towards maintaining fleet readiness through ship repair.

The SIMA's budget request to CNSL then travels the circuits of the DoD Planning, Programming and Budgeting System (PPBS). The PECI fund codes, Productivity Enhancement Incentive Fund (PEIF) and Productivity Investment Fund (PIF), are both unique to the PPBS system of budgeting. A more detailed review of these two fund codes is included in the next segment on budgeting.

2. Budgeting

> A budget is a plan expressed in quantitative, usually monetary, terms and covering a specified period of time. The time period is usually a year. [Ref. 20:p. 30]

The SIMA's budget plan, similar to most in DoD, covers three fiscal years. The Prior Year deals with current year operational requirements. Primary emphasis is on the O&M,N money. The Apportionment Year and the Budget Year cover long range OPN budget items. Productivity Enhancement (PE) screening of selected investment equipment occurs in these two outyears. CNSL solicits submissions from two general areas:

a. Operating Forces Support Equipment (OFSE). These items are general purpose equipment which have a unit value of $3,000 or more, and are not designated for stock fund management in the central supply system.

b. Industrial Plant Equipment (IPE). This equipment has an acquisition cost of $3,000 or more and is used in the physical, electrical, or chemical alteration of materials. These items are managed by the Defense Industrial Plant Equipment Center (DIPEC). [Ref. 21:p. Q-2]

In addition, two types of PECI funds are available:

a. Productivity Investment Funds (PIF). Projects which cost $100,000 or more and have a payback period of 4 years or less.

b. Productivity Enhancement Incentive Fund (PEIF). Projects which cost less than $100,000 and have a payback period of 2 years or less. [Ref. 22:p. 4]

Both OFSE and IPE investment submissions can be screened for inclusion in the PECI program. Projects selected for PEIF funding are financed from drawing accounts established with annual appropriations. Thus, under the PECI program, funded projects, if approved, are realized in the prior year rather than the two outyears. In addition to the annual apportionment input, the type commander (TYCOM), CNSL, acting as a sub-claimant, issues an expense operating budget

(EOB) to SIMA. The SIMA allocates the funds to each responsibility center on a quarterly basis, and the various departments control the expenditure of funds.

The O&M,N funds are used at SIMA under the following conditions:

a. Repair Other Vessels Indirect (ROVI). Material drawn/ordered which cannot be related to a specific job control number (JCN) for a benefiting ship, but is used for several ships.

b. Repair Other Vessels Direct (ROVD). Material drawn/ordered to carry out a specific JCN for a specific ship.

c. Own Ship's Use (OSU). Funds to procure materials and supplies for general administration of the command.[9]

The SIMA responds to the budget call from CNSL with its own internal budget call. This internal request goes out to all departments prior to the receipt of CNSL's call. The Supply Officer consolidates all the department inputs into a single activity budget, receives the Commanding Officer's approval, and then forwards the proposed budget to CNSL.

> The end product of these negotiations is a statement of the outputs that are expected during the budget year and the resources that are to be used in achieving these outputs. [Ref. 23:pp. 30-31]

3. Measurement

> During the period of actual operations, records are kept of resources actually consumed and outputs actually achieved . . . costs are collected both by programs and by responsibility center. [Ref. 24:p. 31]

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[9]SIMA, Norfolk, Virginia, interview with the Supply Officer, August 1985.

The SIMA uses the engineered time values (ETV) system for production management. Each department and its various divisions use supporting computer equipment to input work processing data from the point of initial receipt of the work request to the "signing off" of the completed job. Job tracking information is entered at all user stations. The Supply Department enters and tracks logistical data. Administration oversees data related to personnel, and QA looks at requirements related to both material and personnel.

The system provides the various users with critical information on work inducting, work screening, work planning, work scheduling, work issuing, and work progressing. As the planned work is completed, the planned man-hours for that work are converted to earned man-hours. The earned man-hours form the basis for measuring performance. Additionally, the ETV system provides an accurate measure of personnel utilization.

Ultimately, SIMA is able to centrally manage responsibility center performance, personnel utilization and most importantly, make changes to the MCS to ensure maximum output with the least amount of resources expended. Thus, through the ETV System, productivity and its measurement are further defined. [Ref. 25:pp. 1-2--1-3]

4. Reporting and Analysis

The ETV system also addresses the reporting and analysis area of MCS. Weekly, an analysis summary is

provided to the system users. This report provides data on performance, utilization, and lost productive time. In addition, a weekly analysis detail outlines productive man-hour distribution, productive man-hour indices, deductions from productive man-hours available, and lost productive time. Monthly, the analysis summary is provided to users for comparison, review, and forecasting. [Ref. 26:pp. 3-5]

The Supply Department also provides requisition status on all material ordered in support of ship repair. Together, the ETV summaries and the logistical summary provide key information on the current operations at SIMA.

External reporting primarily involves statistical information on individual ship repair. This information is provided to the ship, RSG, and CNSL. The focus of the report is the ratio of jobs submitted by the ship to jobs completed by SIMA. Additional consideration is given to jobs that are rejected due to lack of parts support, jobs that are outside the scope of SIMA's repair capability, or jobs that are not authorized due to higher authority constraints.

C. SUMMARY

The SIMA's MCS system includes all aspects of the organization. The ETV system encompasses a very complete, well-integrated data base. The information that management receives via this Management Information System (MIS) is useful in balancing all the varied parts of the operation to achieve the goal of ship repair. The SIMA's MCS is a

coordinated, integrated system that focuses on ship repair and the responsibility centers necessary to accomplish that objective.

IV. PRODUCTIVITY MEASUREMENT

As outlined in Chapter II, one of the major elements of the DoD productivity program is productivity measurement. Productivity measurement in the DoD is an efficiency measurement. Quantifying the outputs and inputs of an activity and expressing the two as a ratio provides management with a means to both measure and evaluate their organizations' productivity. [Ref. 27:p. 21]

All work must first be measured to form a basis for comparison; such bases are called standards. Standards come in four varieties:

- Engineered standards;
- Historical standards;
- Off-the-wall standards;
- Educated guesses. [Ref. 28:p. 159]

In 1980 engineered performance standards were introduced at Shore Intermediate Maintenance Activity (SIMA), Norfolk, Virginia. The introduction of these standards, known as Engineered Time Values (ETV) provided the basis for a new production management system. The system gives SIMA the capability to manage work from the point of job induction through to job completion, and to accurately measure and analyze productivity. [Ref. 29:p. 1-1]

The purpose of this chapter is to present the formal measurement system that exists at SIMA, Norfolk.

A. ENGINEERED TIME VALUE SYSTEM

At the Intermediate Maintenance Activity (IMA) level the application of ETV provides the cornerstone for planning and controlling work and for upgrading the quality and quantity of work. Utilized in all facets of ship repair, the ETV System, supported by computer equipment, is able to provide SIMA with a management capability for:

- Work inducting;
- Work screening;
- Work planning;
- Work scheduling;
- Work issuing;
- Work progressing. [Ref. 30:pp. 1-2]

Planned man-hours are converted to earned man-hours as work is completed. Earned man-hours represent the actual man-hours of work completed. The earned man-hour data are used to measure performance and personnel utilization. Together these two measures provide SIMA with a measure of productivity. [Ref. 31:pp. 1-2]

B. PRODUCTIVITY MEASUREMENT AND ANALYSIS

Output measurement in a service-oriented organization is never easy. SIMA is constrained by an operating budget just like any private sector industrial organization. The ability to keep ships employable often times requires the use of outside supply sources when the repair requirement is urgent and part support within the Navy does not exist. Cost control

in contracting and procurement under these circumstances is vital to SIMA's ability to meet the repair needs of the fleet. Similarly, prudent production practices by first line managers can affect SIMA's output. Material, personnel, or procedural waste all affect productivity and are directly related to SIMA's budget.

Yet for the first-line managers who head SIMA's responsibility centers, extending the repair potential of SIMA's budget through improved work measurement techniques and labor saving equipment is not generally viewed as vital to their performance or their division's productivity.

Before the advent of the ETV system of productivity measurement at SIMA, performance evaluation was generally subjective. This type of evaluation has a long-standing history in many areas of Navy management. Operating without measurement standards is common. Having measurement standards and not using them is also common. ETV provides the standards necessary for quantitative analysis.

1. Performance Standards

A performance standard in the ETV system is the time it should take to complete an assigned job. Accurate time measurement considers job conditions, the qualifications of the individual(s) doing the work, the method of doing the work and the impact of normal delays. Measurement under these conditions was an improvement, but the subjectivity of certain factors led to further refinement. Finally,

Methods-Time-Measurement (MTM), which takes basic motions involved in the performance of a task and assigns time based on average skill and average conditions, was adopted. [Ref. 32: pp.1-3] Thus, MTM complements ETV and strengthens the final analysis product.

2. Productivity Measurement

Three factors contribute to productivity. They are:

- Performance;
- Utilization;
- Method. [Ref. 33:p. 3-1]

Performance is obtained when the shop workload is equal to the available direct labor hours to accomplish that workload.

$$\text{Performance} = \frac{\text{Earned Man-Hours}}{\text{Net Productive Available Man-Hours}} \times 100$$

Utilization is a quantitative expression. It considers how well productive man-hours were utilized in actual productive assignments.

$$\text{Utilization} = \frac{\text{Net Productive Available Man-Hours}}{\text{Gross Productive Available Man-Hours}} \times 100$$

Method is qualitative. This reflects the process of work planning, knowledge of job requirements, standard practices, management directives, and traditions. These factors are usually not considered unless the other two factors

indicate a need for change. The product of the first two factors is productivity. [Ref. 34:p. 3-7]

$$\text{Productivity} = \frac{\text{Earned Man-Hours}}{\text{Gross Productive Available Man-Hours}} \times 100$$

Several elements affect performance and utilization. The elements affecting performance are:

- Shop workload;
- Lost productive time;
- Skill factor;
- Supervisory contribution.

The elements affecting utilization are:

- Productive support man-hours;
- Total deductions from productive man-hours available. [Ref. 35:p. 3-1]

Variability of workload at SIMA can not be controlled by the repair division supervisors. If workload could be controlled, then optimum performance could be realized. Optimum performance exists when shop workload is equal to the available direct labor hours to accomplish that workload. To compensate for the lack of control, an additional factor, workload performance, was added. Workload performance reflects how well shop personnel performed for the week, based on total work accomplished compared to man-hours assigned to work. This additional factor enables shop performance to be measured regardless of loading inconsistencies. [Ref. 36: p. 3-2]

$$\text{Workload Performance} = \frac{\text{Earned Man-Hours}}{\text{Net Productive Available Man-Hours} - \text{Man-Hours Unassigned to JCN's}} \times 100$$

3. Productivity Measurement Reporting

Collection of data occurs at the shop level. This information is essential to the overall measurement of productivity. SIMA currently uses Analysis Records and Reports (ARRS) personnel to supplement the various repair division personnel in the collection of data. These personnel serve three purposes:

1. Collection and entry of job progress information;
2. Collection and entry of lost productive time information;
3. Collection and entry of personnel utilization information. [Ref. 37:p. 3-3]

Three primary reports result from the collected data and are used by the various management levels to analyze productivity. The reports address both divisional and shop level performance. These reports are:

- Weekly ETV Analysis Summary-Performance;
- Weekly ETV Analysis Summary-Utilization;
- Weekly ETV Analysis Summary-Lost Productive Time. [Ref. 38:p. 3-5]

These weekly reports provide SIMA's managers with a means of identifying performance and utilization trends. As the data base grows, managers are able to eliminate factors and elements which do not affect productivity, while enhancing those that show a correlation with the specific performance

measure being evaluated. At SIMA the implicit benefit is increased efficiency and improved productivity.

C. QUALITATIVE ANALYSIS

The previous section addressed the impact quantitative factors have on productivity. Several factors do not directly affect productivity measurement, but their impact on the overall measure of performance and utilization is significant.

Common qualitative factors which affect performance, utilization and method are:

- Management/supervisor attitude;
- Shop manning;
- Availability of tools and equipment;
- Shop forecasting and loading;
- Supervisor and technician training. [Ref. 39:p. 3-36]

During informal interviews with the various supervisors at SIMA, these same factors and their impact were seen as major items affecting the overall productivity of their various divisions and shops.[10]

Specifically, the first line managers at SIMA feel:

- The benefits that the ETV system offers to SIMA's managers is not generally understood. Managers at SIMA view the ETV system as a means to "look good." Meeting the goals of the measurement system is important because higher management uses the summary reports to forecast productivity trends.

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[10] SIMA, Norfolk, Virginia, interviews with the Repair Division Officers, August 1985.

- Historically, personnel manning levels are usually inconsistent with the mission of the activity. The inconsistencies are either in total numbers, or in the qualifications held by individuals. The former are usually shortages, while the latter are a lack of proper qualifications for the assigned billet.

- Availability of proper tools and equipment is tied closely to the budget and the supply system. Items not in stock or not carried can affect productivity. Lack of new, improved, or replacement equipment items can be the result of poor capital investment planning, or planned procurements may be impaired by unavailability of budget dollars.

- The time required to train a technician once he or she has completed required formal training is often offset by personnel rotations. A common problem for most activities is justifying the time it takes to qualify an individual in a position versus the projected tour length of the same individual. In most commands this disruptive cycle results in major deficiencies in overall quality of work output and the efficiency with which work progresses.[11]

D. CONCLUSIONS

SIMA is utilizing the ETV System. Its impact on productivity is difficult to gauge because:

- First line supervisors do not fully understand the benefit such a system could have on their management capabilities.

- System users do not believe the results on the weekly summaries. The results on an ETV summary report usually reflect lower actual performance percentages than the supervisor estimates by his subjective analysis.

- First line supervisors all measure productivity based on their knowledge of their personnel's potential and their professional experience.

- SIMA's managers use subjective factors to judge their division and shop performance. The key factors are those mentioned in the previous segment.

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[11]SIMA, Norfolk, Virginia, interviews with the Repair Division Officers, August 1985.

The potential impact that the ETV System can have on SIMA is clear. The present system is a mixture of the ETV System summary data and the supervisor's "gut feeling." Trend analysis provides a limited benefit for management, because the measuring potential of the ETV System is hindered by the manager's inaccurate and inconsistent method of evaluating his unit's productivity. The utilization of ARRS personnel in the divisions negates some of the subjective influence that currently exists, but full participation is essential if SIMA is going to:

- Continue to meet the repair needs of a growing surface navy.
- Adequately audit its Management Control System (MCS) and make the necessary adjustments to enhance productivity.
- Provide management with an accurate management information tool.
- Adequately justify future procurement requests for Productivity Enhancement Incentive Fund (PEIF), Productivity Investment Fund (PIF), or Industrial Plant Equipment (IPE) funding.

V. PRODUCTIVITY IMPEDIMENTS AT SIMA

Concern over a general decline in productivity in the United States prior to 1970 caused Congress, along with other governmental agencies, to embark on a program designed to enhance productivity. The program that resulted was intended to enhance productivity through capital investment. The Productivity Enhancing Capital Investment (PECI) program sought to enhance Department of Defense (DoD) output, but it was not until after the inception of the program that the services realized impediments to productivity existed. Several governmental studies were undertaken to determine the source of these impediments. This chapter briefly discusses the early findings of these studies and then focuses on the current impediments affecting Shore Intermediate Maintenance Activity (SIMA), Norfolk.

A. EARLY FINDINGS

In 1974 the term "misdirected incentives" was used to describe incentive structures within organizations that cause people to act contrary to established norms within the organization. Such contradictory action was generally related to three factors:

1. The measurement system. Managers concern themselves only with the items affecting their performance evaluation and those items that will make them "look good."

2. The reward system. Managers will act to enhance their own interests over the good of the organization.

3. The personal characteristics of individual managers. In some instances managers actions cause subordinates to act opposite to their good judgment. An example is the situation where a subordinate fails to report bad news because of the reaction he or she receives from the manager. [Ref. 40:p. 1]

In 1978, a conference was held to discuss the issues which impacted most on military productivity. The key issues identified were:

1. Lack of effective ways to measure productivity;
2. Lack of an adequate reward system;
3. Systems that pose negative incentives for those who enhance productivity;
4. Personnel promotions on technical competency alone;
5. Inadequate relations between management and unions on issues of productivity;
6. Disruptive rotations of military and civilian managers;
7. Lack of training and development of career civilians;
8. Need for better relations between civilians and military managers;
9. Excessive use of inspections and audits;
10. Inappropriate use of management information and reporting systems which leads to counterproductive behavior;
11. Lack of capital investment; and
12. Lack of supply support. [Ref. 41:p. 3]

The early discussions and conferences on the problems of productivity enhancement appear to have converged on one issue, the internal impediments within an organization. Shortcomings in productivity in the DoD initially appeared to

be related to inefficiencies in general output as was discussed in Chapter II. Employment of capital investment techniques to improve work output has been and still is overshadowed by the existing impediments in Navy organizations. Capital investment is a factor that can enhance productivity if the local impediments are removed.

B. CURRENT IMPEDIMENTS AT SIMA

The SIMA's impediments that exist generally fall into three categories:

- Impediments that could be controlled by the local management;
- Impediments that are common to more than one organization or activity in the Navy;
- Impediments that are unique to SIMA.

A series of informal interviews conducted at SIMA, Norfolk in August 1985 with various first line managers is the basis for the remaining discussion. Since the issue concerns productivity and the effect of impediments on the improvement of productivity, most of the sampling was conducted in the repair department.

1. Management and Local Impediments

a. Erratic Workload

Several divisions cited problems that arise from uneven workload flow. Although most of these fluctuations in shop workload can be attributed to outside elements in the organizational environment, particularly the priorities set by the operational fleet commanders, most of the first-line

managers felt more internal effort should be made to smooth the controllable workload.[12]

The erratic workload results in personnel being temporarily assigned to other shops within the division or transferred to other divisions. Skill development is reduced through personnel placement changes. Productivity standards suffer from the constant changes which occur in divisional manning levels. Ultimately, managers are faced with morale problems. The changing tempo of fleet operations, irregular submission of components for repair by fleet units, and funding constraints all affect work induction. At peak points of work induction, managers are forced to schedule overtime to compensate for the additional workload requirements. Thus, inability to manage workload impacts most heavily on productivity, morale, and skill development.

b. Management Knowledge

Knowledge of the PECI program and its potential benefits is non-existent among first line managers at SIMA. In order for a program to work effectively, the purpose and objective must be understood by the members of the organization. At SIMA, the supply officer, has the only knowledge about the program. Except for the annual Other Procurement Navy (OPN) budget call that comes down from the Commander,

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[12]SIMA, Norfolk, Virginia, interview with the Repair Officer, August 1985.

Naval Surface Forces Atlantic (CNSL) no promotion of the PECI program generally occurs at SIMA.[13]

Compounding the lack of knowledge about the PECI program is the general knowledge first line managers have about the Industrial Plant Equipment (IPE) process. At SIMA, PECI and IPE are synonymous among first-line managers. Lead time frustrations generally result from using IPE, when PECI could have provided in-year results.

2. Management and Outside Impediments

a. Personnel Rotation

Military rotations and their effect on an activity's productivity are not isolated just to the SIMA at Norfolk. Personnel rotations have long been a routine problem for managers in the Navy. Command retention programs focus most of their attention on identifying top performers. Although the career opportunities for these select few people are numerous, most commands will go to considerable lengths to retain these quality performers onboard for a second tour or an extension. Generally, these same personnel are also on the critical ratings list, which means shortages already exist. Additionally, the need to keep operational billets manned to 100 percent poses further hardships on a shore command like SIMA, which typically retains a technician for two or three years instead of the typical four to six year tours common on sea duty.

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[13]SIMA, Norfolk, Virginia, interview with the Supply Officer, August 1985.

In managerial positions at SIMA this hardship is further compounded. During a typical two year assignment a leader must learn what his or her job is all about and then gain the confidence of his or her subordinates if his or her contributions will be useful.

A final consideration on rotations and the overall issue of shortages poses a third dilemma. Often rotation of personnel results in gapped billets. Currently at SIMA, the repair department is short three officers and most of the divisions are managed by senior chiefs or master chiefs instead of a commissioned officer.[14]

b. Cost-Benefit Analysis

The PECI program requires that a formalized request be submitted if an activity desires to make a capital acquisition using one of the available PECI funds. This justification entails detailed analysis of the cost of the equipment versus the projected benefit. No one at SIMA or any other similar activity is formally trained to perform such analysis. The supply officer, who is the most likely candidate, has not been trained to do cost-benefit analysis since the curriculum at supply school does not offer this training. Typically, if a supply officer or any other manager has such a skill, he or she has attained this training on his or her own time. Thus, the resulting cost estimates and forecasted pay-back

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[14]SIMA, Norfolk, Virginia, interview with the Repair Division Officers, August 1985.

amortization data are generally inaccurate and po entially will never provide the suggested savings quoted in the commands original proposal.[15]

At SIMA these analyses have been prepared by various individuals. The most recent individual was a first class petty officer in the supply department. Although his efforts were thorough, he also lacked the requisite training necessary to present a sound justification.

A secondary problem that occurs in the rough work-up of the proposal is data collection. At SIMA the engineered time value (ETV) system is the only source of productivity data available. Because the system is new and lacks credibility among the users, the validity of data is also questionable. Thus, the problem of productivity measurement further accentuates the analysis problem at SIMA.

Lack of meaningful data and insufficient training deter activities from submitting proposals. Beneficial suggestions from the workers are stagnated by the frustrations of a program that is not "user friendly."

c. Work Attitudes

The personnel at SIMA generally displayed a positive attitude toward their jobs. In most instances the negative attitudes were directly attributable to the impediments previously discussed. Encountering the same obstacles over

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[15]SIMA, Norfolk, Virginia, interview with the Assistant Supply Officer, August 1985.

and over again tended to dampen enthusiasm among the workers and managers. Because PECI is virtually unknown at SIMA, it is difficult to assess the positive or negative impact such a program would have on these same individuals.

3. Unique Management Impediments

a. Differences Within a Class of Ships

The SIMA services approximately a dozen classes of ships. Generally the equipment in each class is the same. Ship construction locations vary within classes and this can result in subtle differences among ships of the same class. Also, each time a ship is overhauled, modifications result that further separate the ship's original class specifications into unique problems for activities like SIMA.

As a result, SIMA now has to deal with each ship as if it were a unique class. Efficiency in repair, production standards, and management's ability to plan work are all impediments to productivity because no two ships in the same class are alike.

Technical manuals and blueprints often do not agree with the current installation. Delays are encountered, workloads vary, and workers are frustrated by the obstacles the system poses during each repair availability.[16]

b. Inadequate Repair Equipment

The differences in ships that was addressed in the last section causes another unique dilemma. Equipment

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[16]SIMA, Norfolk, Virginia, interview with the Repair Division Officers, August 1985.

alterations and modifications often precede equipment update at SIMA. The most critical problem occurs within the electrical and electronic divisions. The impact on productivity is detrimental. Ships come into availability only to discover that SIMA lacks the capability to repair new or altered equipment. Left with no alternative, the type desk or the Readiness Support Group (RSG) which screens jobs, is left with only one option, utilization of an outside contract. This usually means delays in repair and excessive costs. Increased costs of outside repair decrease the productive capacity of SIMA and the limitations imposed by Congressional. budget constraints further shrinks the productive capacity of SIMA's budget dollar.

The current shipbuilding program in the Navy also compounds this problem. New classes of ships are generally operational before adequate parts support is available. These same ships often report for duty without a complete set of blueprints or technical manuals. Refurbished units such as the battleships suffer from the ills of inactive service and the major structural changes that occur in the reactivation and modernization process. Thus, for SIMA, productivity enhancement is impeded by the uniqueness of the repair problem.

C. IMPEDIMENT CONCLUSIONS

The current impediments have changed very little from the initial ones that blocked the success of the Navy's program in the 1970's. The productivity program needs to address

the current impediments first. Capital investment posed against the existing obstacles will continue to be ineffective as an enhancing element in the repair of ships at the SIMA. Until the first line managers at SIMA are made aware of the PECI program and its benefits, the objectives and goals of a productivity initiative will remain ineffective. Continued growth of the surface Navy will require the SIMA at Norfolk to expand and modernize to meet future needs. The impediments will not solve themselves, nor will ship repair provide quality service without productivity enhancement.

VI. CONCLUSIONS

A. GENERAL

An effort has been made in this study to examine the nature of the Productivity Enhancing Capital Investment (PECI) program at Shore Intermediate Maintenance Activity (SIMA) through its history, its problems, and its future. The history is clear. The trends describe accurately how the PECI program has evolved to its present condition. The outlook for the future, if the trends are allowed to continue, is not good. Action needs to be taken. As can be seen by analyzing the effects of past studies, history is repeating itself. The program goals and objectives have not changed. Current auditing of the program indicates that the same shortcomings which initially weakened the overall Department of Defense (DoD) productivity program still exist.

In making decisions regarding the future of the PECI program, one needs to evaluate the goals or objectives that are intended to be achieved. Are the goals the same as stated in 1973, or have they changed? Are PECI funded equipments at SIMA attaining the desired benefits? Is the program use at SIMA representative of the Navy's program in general? Is there sufficient input from SIMA or any Naval activity on a yearly basis to justify continued maintenance of the available funding? Unfortunately the answer to all of these questions, except for the first one, is no.

SIMA will continue to repair ships. The productive output might not be as high as it could have been under a successful PECI program. That is fine as long as the resource quantities and number of ships remains constant or declines.

Examine the current trends in Naval ship construction. If the current number of ships grows to a 600 ship Navy as planned, would the productive capacity at SIMA be able to sustain that number of ships? If the number of Naval bases increases to complement this increase in ship numbers as is scheduled, would available resources support the development of a SIMA in each of these ports? If co-location of a SIMA at each new port did not occur, would SIMA's current productive capacity meet the increased needs of a more dispersed fleet? These are distinct possibilities. The Navy can not afford to let the productive output of any SIMA decline.

B. EVALUATION OF SIMA'S CURRENT PROGRAM

1. SIMA's Role

The SIMA at Norfolk does not have an active PECI program. In Fiscal Year 1984 SIMA submitted one project for Productivity Enhancing Incentive Fund (PEIF) review and the funding was denied. At the time of the author's visit there was one proposal in progress, which was the only submission for Fiscal Year 1985. In Fiscal Year 1984 only 9 PEIF projects were approved in the entire Navy, and these submissions came from only 7 commands [Ref. 42]. Thus, not only is SIMA's

program non-existent, the entire Navy's program is virtually non-existent.

2. The Knowledge Factor

Information flow and instructional guidance from higher level commands to Commander, Naval Surface Forces Atlantic (CNSL) is generally clear. Internally, SIMA first line managers equate productivity enhancement with the Industrial Plant Equipment (IPE) program. Between the first line managers and CNSL the knowledge of Other Procurement, Navy (OPN) funding and the various programs which fall under OPN is weak, except for the supply officer. One of the initial goals of the PECI program was to "promote productivity at all levels of management," and the level that should be most aware of the PECI program is totally unaware. Lack of knowledge among first line managers is the number one impediment to the existing PECI program.

3. The Other Impediments

Except for the apparent lack of knowledge concerning the PECI program at SIMA, the other impediments such as work-load, personnel rotation, and weaknesses in economic analysis have existed from the start. SIMA has acted to decrease the impact that workload has on its personnel. Divisions that are historically always overloaded, such as the pipe shop or valve shop, have gone to shift work. In addition, reserve implementation on drill weekends is providing substantial input to the overall output of SIMA's productive potential.

4. Productivity Measurement

Standardized measurement of productivity is substantially better at SIMA under the Engineered Time Values (ETV) system, but without support from first line managers, the likelihood that divisional productivity will remain a qualitative measure, heavily influenced by the division officer's "gut feeling," is extremely high.

Without a good standard for measurement, the Management Control System (MCS) at SIMA will remain ineffective in resource utilization. A sound MCS at SIMA is vital; without it the efficiency of management and the resulting ability of SIMA to effectively manage its primary goal of ship repair is highly questionable.

C. RECOMMENDATIONS

PECI is an integrated program that exists at all levels within the Navy. If the program is going to survive the watchful eye of Congress, the base commands are going to have to work towards the goals and objectives initially established in 1973. SIMA should establish a PECI program. This goal can be achieved by:

(1) Establishing a productivity enhancing committee;

(2) Providing all levels of SIMA management with a detailed brief on the intent of the PECI program;

(3) Providing recognition for users of the program;

(4) Obtaining cost-benefit training for first line managers;

(5) Using the ETV system to standardize measurements;

(6) Using productivity to evaluate the effectiveness of SIMA's responsibility centers.

In conclusion, if PECI is going to enhance productivity at SIMA, the program must receive the support of all personnel all of the time. Outputs can not increase from a dwindling supply of limited resources without an aggressive effort aimed at capitalizing on the beneficial suggestions of the workers.

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